This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

1. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 23 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

   The solution is About 7 percent, which is option D.

   A. About 11 percent

   This corresponds to solving correctly but treating both radius and height as equal contributors to the volume.

   B. About 3 percent

   This corresponds to not solving for the increase properly.

   C. About 12 percent

   This corresponds to treating both radius and height as equal contributors and not solving correctly.

   D. About 7 percent

   * This is the correct option.

   E. None of the above

   If you chose this, please contact the coordinator to discus how you solved the problem.

   General Comment: Remember that when plugging the increases of values in, you need to treat it as that percentage above 100. For example, a 5 percent increase means 105 percent.

2. Solve the modeling problem below, if possible.

   In CHM2045L, Brittany created a 18 liter 10 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 5 percent and 28 percent solutions, what was the amount she used of the 5 percent solution?

   The solution is $14.09 liters$, which is option D.

   A. $3.91 liters$

   This is the concentration of 28 percent solution.

   B. $9.00 liters$

   This would be correct if Brittany used equal parts of each solution.

   C. $9.48 liters$

   This was a random value. If this was not a guess, contact the coordinator to talk about how you got this value.

D. 14.09*liters*

*This is the correct option.

E. There is not enough information to solve the problem.

You may have chose this if you thought you needed to know how much of the second solution was used in the problem. Remember that the total minus the first solution would give you the second amount used.

General Comment: Build the model exactly as you did in Module 9M. Then, solve for the volume you are looking for.

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3. Solve the modeling problem below, if possible.

   A new virus is spreading throughout the world. There were initially 8 many cases reported, but the number of confirmed cases has doubled every 5 days. How long will it be until there are at least 1000000 confirmed cases?

   The solution is About 85 days, which is option B.

   A. About 25 days

   You modeled the situation correctly but did not apply the properties of log correctly.

   B. About 85 days

   * This is the correct option.

   C. About 23 days

   You modeled the situation with e as the base and did not apply the properties of log correctly.

   D. About 59 days

   You modeled the situation with e as the base, but solved correctly otherwise.
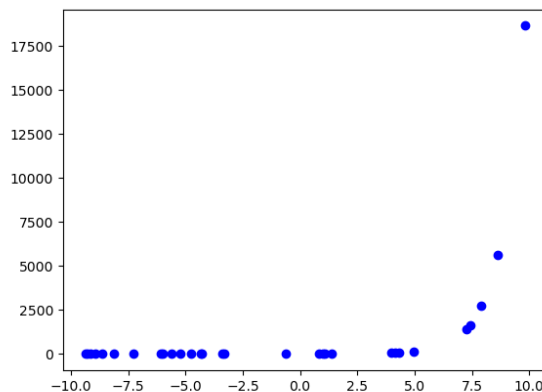
   E. There is not enough information to solve the problem.

   If you chose this option, please contact the coordinator to discuss why you think this is the case.

   General Comment: Set up the model the same as in Module 11M. Then, plug in 1000000 and solve for d in your model.

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4. Determine the appropriate model for the graph of points below.

The solution is Exponential model, which is option B.

A. Logarithmic model

   For this to be the correct option, we want a rapid change early, then an extremely slow change later.

B. Exponential model

   For this to be the correct option, we want an extremely slow change early, then a rapid change later.

C. Non-linear Power model

   For this to be the correct option, we need to see a polynomial or rational shape.

D. Linear model

   For this to be the correct option, we need to see a mostly straight line of points.

E. None of the above

   For this to be the correct option, we want to see no pattern in the points.

General Comment: This question is testing if you can associate the models with their graphical representation. If you are having trouble, go back to the corresponding Core module to learn about the specific function you are having trouble recognizing.

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5. For the information provided below, construct a linear model that describes her total costs, C, as a function of the number of months, x she is at UF.

   Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a $1000 educational expense each year. Before college, Aubrey saved up $5000. She knows she will need to pay $800 in rent a month, $60 for food a week, and $32 in other weekly expenses.

   The solution is $C(x) = 1168x$, which is option C.

   A. $C(x) = 1168$

      This describes the costs as if they are one-time only and not monthly.

   B. $C(x) = 892x$

      This treats weekly expenses as monthly expenses rather than multiplying each weekly expense by 4.

   C. $C(x) = 1168x$

      * This is the correct option.

   D. $C(x) = 892$

      This treats weekly expenses as month expenses rather than multiplying each weekly expense by 4 AND does not account for these expenses per month.

   E. None of the above.

      You may have chosen this as you thought you were modeling total income or total budget.

   General Comment: This is a Costs, Profit, Revenue question! The most common issues here are: (1) not converting the weekly costs to monthly costs, (2) treating the one-time values like savings and educational expense as happening per month, and (3) not checking that your model is for cost, profit [income], or revenue [budget].

6. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 30 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

   The solution is About 9 percent, which is option C.

   A. About 14 percent

   This corresponds to solving correctly but treating both radius and height as equal contributors to the volume.

   B. About 15 percent

   This corresponds to treating both radius and height as equal contributors and not solving correctly.

   C. About 9 percent

   * This is the correct option.

   D. About 3 percent

   This corresponds to not solving for the increase properly.

   E. None of the above

   If you chose this, please contact the coordinator to discus how you solved the problem.

   General Comment: Remember that when plugging the increases of values in, you need to treat it as that percentage above 100. For example, a 5 percent increase means 105 percent.

7. Solve the modeling problem below, if possible.

   In CHM2045L, Brittany created a 26 liter 44 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 15 percent and 45 percent solutions, what was the amount she used of the 45 percent solution?

   The solution is $25.13 liters$, which is option C.

   A. $0.87 liters$

   This is the concentration of 15 percent solution.

   B. $13.00 liters$

   This would be correct if Brittany used equal parts of each solution.

   C. $25.13 liters$

   *This is the correct option.

   D. $14.84 liters$

   This was a random value. If this was not a guess, contact the coordinator to talk about how you got this value.

   E. There is not enough information to solve the problem.

   You may have chose this if you thought you needed to know how much of the second solution was used in the problem. Remember that the total minus the first solution would give you the second amount used.

General Comment: Build the model exactly as you did in Module 9M. Then, solve for the volume you are looking for.

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8. Solve the modeling problem below, if possible.

   A new virus is spreading throughout the world. There were initially 3 many cases reported, but the number of confirmed cases has tripled every 5 days. How long will it be until there are at least 10000 confirmed cases?

   The solution is About 37 days, which is option D.

   A. About 41 days

      You modeled the situation with e as the base, but solved correctly otherwise.

   B. About 21 days

      You modeled the situation correctly but did not apply the properties of log correctly.

   C. About 22 days

      You modeled the situation with e as the base and did not apply the properties of log correctly.

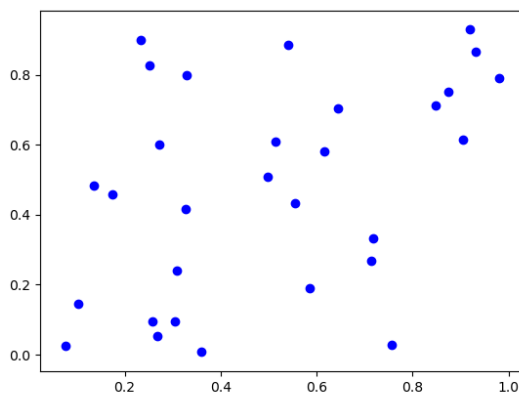   D. About 37 days

      * This is the correct option.

   E. There is not enough information to solve the problem.

      If you chose this option, please contact the coordinator to discuss why you think this is the case.

   General Comment: Set up the model the same as in Module 11M. Then, plug in 10000 and solve for d in your model.

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9. Determine the appropriate model for the graph of points below.

   The solution is None of the above, which is option E.

   A. Logarithmic model

      For this to be the correct option, we want a rapid change early, then an extremely slow change later.

   B. Linear model

For this to be the correct option, we need to see a mostly straight line of points.

C. Exponential model

For this to be the correct option, we want an extremely slow change early, then a rapid change later.

D. Non-linear Power model

For this to be the correct option, we need to see a polynomial or rational shape.

E. None of the above

For this to be the correct option, we want to see no pattern in the points.

General Comment: This question is testing if you can associate the models with their graphical representation. If you are having trouble, go back to the corresponding Core module to learn about the specific function you are having trouble recognizing.

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10. For the information provided below, construct a linear model that describes her total budget, B, as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a $800 educational expense each year. Before college, Aubrey saved up $5000. She knows she will need to pay $800 in rent a month, $80 for food a week, and $48 in other weekly expenses.

The solution is $B(x) = 5800 - 1312x$, which is option D.

A. $B(x) = 4488x$

This treats the educational expense and savings as something you get every month rather than a 1-time payment.

B. $B(x) = 4872x$

This treats the educational expense and savings as something you get every month rather than a 1-time payment AND treats weekly expenses as month expenses rather than multiplying each weekly expense by 4.

C. $B(x) = 5800 - 928x$

This treats weekly expenses as month expenses rather than multiplying each weekly expense.

D. $B(x) = 5800 - 1312x$

* This is the correct option.

E. None of the above.

You may have chosen this if you thought you were modeling total costs or income.

General Comment: This is a Costs, Profit, Revenue question! The most common issues here are: (1) not converting the weekly costs to monthly costs, (2) treating the one-time values like savings and educational expense as happening per month, and (3) not checking that your model is for cost, profit [income], or revenue [budget].